

## **REMARKS/ARGUMENTS**

Claims 1-24 remain pending in this application. All of the claims are rejected. Reconsideration of the claim rejections on the basis of the remarks presented below is respectfully requested.

### **The Rejections Based On 35 U.S.C. §§102/103**

As indicated in the Advisory Action mailed October 10, 2008 the Examiner continues to maintain her rejection of claims 1-24 under 35 U.S.C. 102(b) as anticipated by, or in the alternative under 35 U.S.C. 103 as obvious over, Cetel et al. EP 0 848 071 A1 ("Cetel"). The bases for the §§102/103 rejections were initially set forth in the final Office Action dated April 10, 2008. Further with regard to the subject rejections, the Examiner's response to the applicants' arguments presented in their initial response to the final Office Action (submitted on September 24, 2008) is provided in the Advisory Action.

In the Advisory Action, the Examiner asserts that the claimed composition of the Ni-based single crystal super alloy of the present application overlaps that of EP 0 848 071 A1 of the Cetel et al. reference. Furthermore, regarding the figure provided as Attachment A to the response filed September 24, 2009, the Examiner states that "The Larson-Miller Parameters of the instant invention are only shown for one stress value (137 MPa)".

In response, applicants are providing herewith a new figure as "Attachment A" (hereinafter referred to as "FIG. A"). FIG. A illustrates the relationship between Larson-Miller parameters and stresses loaded onto the alloy. The Larson-Miller parameters of the alloy claimed in the present application under the stresses in a given range are plotted in FIG. A. As shown in FIG. A, Larson-Miller parameters of the alloys claimed in the present application (an area denoted by oblique lines in FIG. A) are clearly greater than those of the alloys of Cetel in the whole range of stresses illustrated in FIG. A. This result shown in FIG. A demonstrates that the alloy claimed in the present application has a strength that is clearly greater than that of the alloy disclosed in Cetel, although the composite ratio of Cr in the alloy is set to the range of 2.0 – 5.0 wt%. Therefore, the alloy claimed in present application provides specific technical advantages over that of the Cetel reference, which advantages are not obvious from the disclosure contained in Cetel, as shown in FIG. A,. This effect is achieved by setting the composition of the elements such as Cr in the alloy to the range as defined in the claims of the present application.

Consequently, applicants respectfully submit that the present alloy is clearly neither anticipated by nor obvious over the disclosure in Cetel.

Furthermore, regarding the Ru content of the alloy, the Examiner states in the Advisory Action that "Cetel teach[es] that the nickel based single crystal super alloy comprises 0-10 % of one or more elements selected from the group III, series 2 and 3 metals (Ru, Pd, Pt, Rh, Ir, Os). Applicant has not submitted factual evidence to exhibit the criticality of Ru in the instant invention".

In response to the above, applicant submits herewith for the Examiner's consideration a copy of Yokokawa, et.al., *Scripta Materialia* 49, pp1041-1046 (2003). Fig. 4 of the reference (on p. 1044) shows partitioning behavior of  $\gamma$  phase (matrix) in the Ni based super alloys which include Ru, Pd, Pt, Rh, and Ir, respectively. It is noted that Os cannot be included in the alloy because of its toxicity. As shown in Fig. 4, Ru is the only element that partitions into the  $\gamma$  phase ( $K > 1$ ) during the entire temperature range illustrated in the figure. In this case, the lattice constant of the  $\gamma$  phase is enlarged, and consequently, the lattice constant of  $\gamma'$  phase (precipitation phase) becomes -0.1% or less of the lattice constant of the  $\gamma$  phase. This improves the creep strength of the alloy.

The Yokokawa et al. reference is listed on the accompanying form provided as a further attachment to this Response and the Examiner is respectfully requested to make the reference of record in the present application by initialing and dating the form and returning it to applicants' representative with the next Communication concerning this application. No fee is believed due with this submission. However, if any fee is due, the Examiner is hereby authorized to charge the required amount to Deposit Account No. 15-0700.

It is the applicants who discovered the unexpected characteristics of Ru, and who, thus, include Ru in the alloy as described in lines 11 to 16 on page 12 of the specification of the present application. The advantages obtained by including Ru in the alloy are not disclosed in Cetel, and therefore, the alloy claimed in the present application and that of Cetel are entirely different each other in respect of the addition of Ru as the essential element in the alloy.

Still further, as explained above the presently claimed alloy, including 4.1 – 14.0 wt% of Ru, has a strength that is clearly greater than that of the alloy disclosed in Cetel, although the composite ratio of Cr in the alloy is set to the range of 2.0 – 5.0 wt%. Therefore, the alloy recited in the claims of the present application provides significant technical advantages which

cannot be expected from the alloy disclosed by Cetel.

Additionally, the composite ratio of Ru in the alloy of the present application (4.1 – 14.0 wt%) does not overlap with that disclosed in Cetel (0.25 – 4.0 %). Therefore, the composite ratio of Ru in the alloy of the present application is neither anticipated nor obvious from the disclosure provided by the subject reference.

For all of the reasons above, therefore, the Examiner is respectfully requested to reconsider and withdraw the §§102/103 rejection of applicants' claims based on the Cetel reference.

### **The Double-Patenting Rejection**

In addition to the rejections discussed above, the Examiner also continues to maintain the obviousness-type double patenting rejection over claims 1-3 of U.S. Patent No. 6,966,956 of Koizumi, et al.

In response to this ground of rejection, applicants submit herewith a Terminal Disclaimer over the subject '956 patent, with the appropriate fee, which is believed to overcome the 'double-patenting' rejection. The Examiner is, thus, respectfully requested to reconsider and withdraw the subject rejection.


### **Summary**

Based on the above, applicants respectfully submit they believe that all of the grounds for rejection have been overcome and the Examiner is, therefore, respectfully requested to withdraw all of the rejections set forth in the final Office Action dated April 10, 2008 and to issue a Notice of Allowance for all the claims currently pending in this application.

THIS CORRESPONDENCE IS BEING  
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Respectfully submitted,



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# ATTACHMENT A<sup>+</sup>

FIG. 6

